

# New Forestry in an Old Struggle

Bruce Babbitt

The environmental controversies of our time are rooted in a old struggle: On the one side are those who view natural resources primarily as material for an international industrial economy, and on the other, those who see forests, mountains, savannas, and wetlands in a wider perspective of values—whether wildlife, recreation, or as a part of our spiritual heritage which obliges us to be stewards of God’s creation.

How do we reconcile them? During the past four years the Clinton Administration has used interdisciplinary science, expanded public consultation, and taken a flexible approach to restoring and conserving public lands and resources.

Examples of this approach are the Everglades restoration project, wildlife habitat conservation plans, the Western Resource Advisory Councils, and the Grand Canyon test flood experiment. But from the first day, we also helped to develop and launch the President’s Northwest Forest Plan and a related series of other forest initiatives across millions of acres of America’s forested landscapes. They have come to be known as New Forestry.

Our first opportunity to shape New Forestry concepts was at hand when the Clinton Administration arrived in 1993. The northern spotted owl had triggered the crisis in the old growth forests of the Pacific Northwest. Yet like a sneeze, the owl was only a symptom warning us that the entire Northwest forest system was sick, overstressed, and in need of treatment.

The forces that saw forests as trees to be farmed for their cellulose had carried that view to new heights of apparent efficiency in the Northwest. Timber companies clearcut vast mountainside tracts, burned the slopes free of slash and replanted bare slopes, from mountain top to stream’s edge, with monocultures of Douglas fir that can be recut and processed every forty years.

## Seeing the Forest and the Trees

But over time these practices have generated a rising tide of public reaction. Salmon streams choked up with dirt slides and runoff from bare mountainsides. And the resulting tree plantations were not authentic forests that families wanted to look at,

much less hike through or camp in. The public responds to the scent of spruce and incense cedars, the sound of wind swaying the boughs of ancient trees, the sight of morning dew sparkling on ferns and mosses, and the chance to eat wild berries and catch native salmon.

The Administration’s response to the crisis can be found in the

work of the Forest Ecosystem Management Assessment Team, carried out by an interagency team under the leadership of **Jack Ward Thomas**, then the chief wildlife research biologist of the Forest Service. The Team’s report is already being recognized as one of the most important documents in the history of American forestry; for the first time it lays out a general ecological basis for the coordinated management of 24 million acres of land administered by the Forest Service and the Bureau of Land Management.

The report tells us that an old growth forest is a complex, living, integrated whole. The scientists told us treating individual symptoms wouldn’t work. We needed to prescribe treatment for the whole forest—a vast landscape that stretches from California to British Columbia. On that scale we had to use interdisciplinary science, like a giant CAT-SCAN, to analyze and catalog more than 1,700 species, components of the forests, and to formulate a plan that would restore the forest to its original health.

For all the science and all the complexity, however, much of the resulting Forest Plan expresses the intuition of any local angler or birder: that you can’t have healthy salmon streams unless the adjacent banks are permanently protected from timber cutting. The President’s Forest Plan reflects this with wide stream buffers along all fish bearing streams, from headwater to tidewater.

Upland habitat tells a similar cautionary tale, as we learned by retracing the food chain of the owl. The spotted owl, like the salmon, needs a network of unbroken corridors textured by a mixed canopy of trees varied by age, size and species. Even “salvage” of dead, rotting fallen trees has an impact: for these logs release nutrients, which feed fungi, truffles and ferns, which feed voles and flying squirrels, which feed, among other things, the spotted owl.

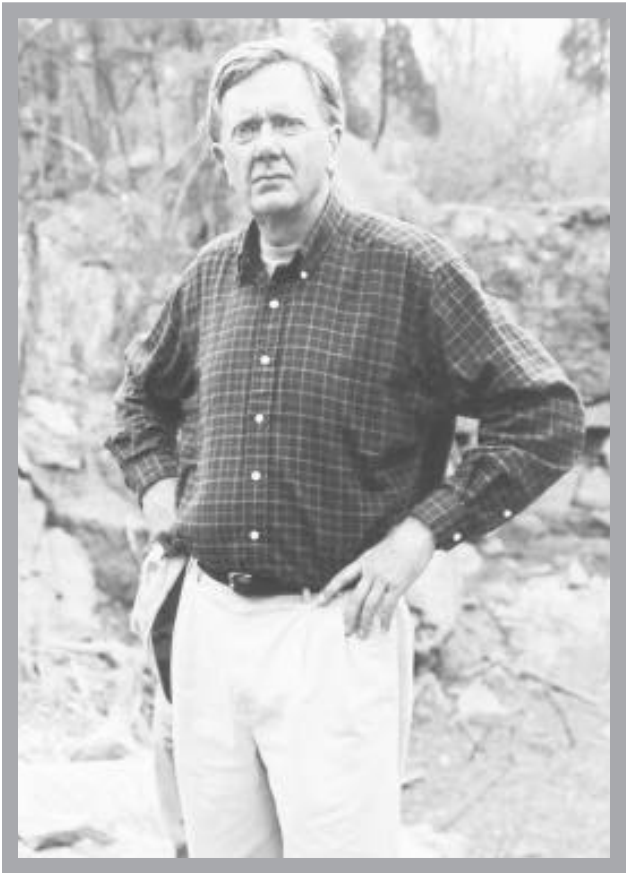
Finally, we also factored in the lessons of island biogeography: If you fragment habitat too much, species extinction becomes inevitable. All these lessons led to a plan to protect and restore structure, health, and diversity. We set aside several million acres of interconnected old growth forest reserves. Outside those cores and corridors, we modified all cutting techniques to protect forest structure, encourage natural reseeding, and maintain habitat corridors throughout the entire landscape.

## The Economics of the New Forestry

The Forest Plan directly addresses the economic issue: Healthy forests are important for a healthy, forest-based economy. If we destroy our old growth forest, we’ll lose jobs in salmon fishing and tourism and eventually in our timber industry as well.

Under the forest plan, logging has been scaled back from the massive, unsustainable cuts of the 1980s. For, at that rate, the forests (and

A lumberman cuts and fells timber in a Bureau of Land Management-managed forest near Mill City, Oregon.



From his first day at Interior, Secretary Babbitt, concerned about the impact of clearcutting that was destroying forests in the Northwest, worked to develop initiatives for sustainable timber harvesting. Collectively known as New Forestry, the reforms work to maintain healthy forests for healthy forest-based economies. Photo by Tami Heilemann, ISC

the forest economy) would be destroyed within a generation, just as they were in an earlier time in New England and the upper Midwest. By scaling back to a sustainable level, we ensure a steady, predictable supply of timber for loggers and mills in the century ahead. And we ensure that the forest towns will continue to diversify, where new people and new industries come for the quality of life and health of the natural landscape.

Four years after the President’s challenge, it’s already working. Unemployment in the Northwest forest communities has hit the lowest level in generations. We didn’t lose 100,000 jobs, as skeptics predicted; we created them.

The Administration is now completing a comprehensive interagency study of the public lands on the east side of the Cascades—the entire drainage of the Upper Columbia River Basin, from the snowy crests of the Cascades across the high deserts of Eastern Oregon and Washington, to the headwaters in Idaho and Montana.

These forests differ dramatically in aridity, temperature, elevation, soils, and frequency of fires started by lightning. When we excluded fire and boosted logging under the utilitarian legacy, these forest underwent stress from drought, disease, insects, overcrowding, and an unnatural successional change from ponderosa pine toward shade tolerant species of spruce and fir. The Forest



Pete Correll, above, the chief executive officer of Georgia-Pacific Corporation, worked with Secretary Babbitt to develop a landmark agreement that set aside 50,000 acres of the company’s forest lands as core habitat clusters for the endangered red-cockaded woodpecker. The process led to five similar agreements with timber companies in the South.

Service and Bureau of Land Management will soon release two comprehensive environmental impact statements that analyze these changes and lay out pathways to restore health across the entire upland watershed.

### *What about private land owners?*

While the New Forestry is working on 250 million acres of federal forest land, fully two thirds of American forests are privately owned. The owners range from individuals with five acre woodlots to corporations like Weyerhaeuser Company and International Paper Company with millions of acres.

East of the Mississippi, eight of every ten trees are privately owned by someone who has a constitutionally protected right to an economic return on that investment. Federal laws like the Endangered Species Act and the Clean Water Act do apply to private forest lands. But on private lands we must apply them with restraint and respect for the rights of the owner, demonstrating early on that an ounce of careful forestry prevents a pound of painful and invasive regulation.

For example, what would we do if a clear symptom—decline of a forest bird that, like the spotted owl, nests only in old growth— were to suddenly break out across the private timberlands of the Southeastern United States? It happened. The bird is called the red-cockaded woodpecker, and it’s been on the endangered species list longer than the spotted owl. But the reason you have not heard as much about it is because there hasn’t been a train wreck like that in the Northwest. And that, in turn, is because we’ve applied the lessons of the New Forestry early, often, and everywhere we could.

In 1993, **Pete Correll**, the head of Georgia-Pacific Corporation, the largest landowner in the region, made a suggestion that I quickly agreed to: Match his foresters with our biologists from the Fish and Wildlife Service to create a sustainable woodpecker plan for 4.2 million acres of the company’s timberland. Our result was a landmark, common sense agreement whereby 50,000 acres—1 percent of the company’s private property—would be preserved in the company’s sustainable forest plan as core habitat clusters for approximately 100 remaining woodpecker groups. That Georgia-Pacific process has led to five more similar timber industry agreements within the South alone.

After these, our next step was to forge more formal covenants, plans that are over the long term broader and more flexible in scope. To that end, we teamed with the Potlatch Corporation in southern Arkansas to develop a full-fledged habitat conservation plan on a 230,000 acre tract. Potlatch, which has the fourth largest population of woodpeckers on private land in the nation, will keep 15,000 acres on rotations that guarantee there will always be at least 6 percent of the land retained in old growth within the shifting mosaic of age groups across the landscape. More than a dozen similar plans are now under development in other parts of the South and on private forest lands in the Pacific Northwest.

### *The Safe Harbor Incentive*

With each success, we have expanded the search for new remedies tailored to specific conditions. For example, could we create positive incentives for landowners to protect and improve habitat? Our biologists in North Carolina set out to try. Two years ago, they came up with a concept now called Safe Harbor. Here’s how it works: Landowners agree to take affirmative steps to improve habitat for woodpeckers, such as controlling the hardwood understory through prescribed fire or cutting.

Then, if and when owners want to cut their trees—to sell as timber or firewood, to farm, even to build a golf course—they give notice and the Fish and Wildlife Service will capture and transfer the birds to suitable habitat elsewhere. It’s simple and effective. Even with some development, properly structured plans will always result in a net increase in suitable habitat. So far, 34 landowners, including the famed Pinehurst Resort, have opted into plans which could yield 67 new woodpecker colonies.

We have also come to understand the special needs of small landowners, who don’t have the resources to produce complex plans. And because of insights gleaned from 15 years of research, we know that in some cases isolated birds in habitat fragments are at high risk of extinction, suggesting they will do better overall when moved to larger unfragmented forests.

The result? In August we reached an agreement with the State of Georgia which eases the regulatory burden on the owners of small woodlots located in fragmented landscapes by allowing the removal of isolated breeding pairs to better habitat in adjacent national forests and other public lands. Five more Southern states—North Carolina, South Carolina, Louisiana, Texas, and Alabama—are all drafting similar plans to accommodate the needs of both landowners and woodpeckers.

And lest there be any doubt about the level of public concern in the south for the fate of our forests, in a regional opinion poll conducted by the Forest Service five months ago, an overwhelming majority of rural residents said no logging should be allowed on 3.2 million acres of national forests in that region. Indeed, two-thirds responded that they would prefer to see those national forests set aside permanently as wilderness. Perhaps this response indicates an intuitive appreciation of an important land management reality—in regions such as the South where there are few public lands, those lands should have proportionately more management emphasis on protection of ecosystem health and public use.

### *Forests Without Endangered Species*

There can be little doubt that the public concern for the future of our forests extends well beyond public lands and well beyond the confines of the Endangered Species Act. Consider Maine, where the pulp and paper industry owns half the state and employs half the rural towns. There, the days of labor intensive, selective logging of forests are nearly gone.

In their place, \$600,000 machines called feller-bunchers now cut and stack trees like chopsticks, snipping one every thirty seconds, clearcutting hundreds of acres a day. Since 1980, 2,000 square miles of Maine forests have been stripped bare. And the citizens of Maine are in rebellion; last month, 80 percent of the voters, proudly rooted to a landscape of history and beauty, voted to restrict clearcutting and to improve forestry practices.



Dick Olson, left, chairman and chief executive officer of Champion International Corporation, and Dick Porterfield, center, the company’s executive vice-president, accept the U.S. Fish and Wildlife Service’s Corporate Stewardship Award from Secretary Babbitt in a ceremony in Washington, D.C.

Fortunately, there are an increasing number of cases where timber companies are taking the initiative. For example, Champion International Corporation has on its own initiative invited state and federal agencies to join in a cooperative research program on a 6,000 acre tract of its property, with the objective of learning more about how to both maintain a healthy species diverse forest and a better sustainable harvest.



Red cockaded woodpecker habitat at Sand hills National Wildlife Refuge.

On other forests Champion has applied this approach on a landscape scale. Assuming that the national forest and other public lands in higher elevations will constitute the core of habitat and species protection, Champion manages adjacent lands by designating as much as 15 percent of its forested areas for special management, including stream buffers, wetland protection, and wildlife corridors connecting to adjacent public lands.

### *A New Era of Reform*

New Forestry innovations, however, apply to only a small percentage of federal, state, and private forest lands. And full implementation of these concepts will also require active participation by the states. Moreover, in recent years the Congress has repeatedly attempted to circumvent laws that embody these initiatives and to undermine the emerging success of the New Forestry by creating special exemptions through budget riders.

The salvage rider, by which Congress evaded environmental laws and mandated an expedited five billion board feet of cuts from national forests, is an example. And in the past two years, Congress at various times attached to Interior appropriations bills a rider to suspend provisions of the Endangered Species Act applicable to the marbled murrelet, a rider to waive environmental laws in the Tongass National Forest, and a rider to terminate the Upper Columbia River Environmental Impact Statement process. These riders were unhorsed only by the threat of Presidential vetoes.

But just as the great forest debates of the last century finally produced a consensus for reform, so the forest controversy of our time must, I believe, finally produce a new era of reform, responsive to the clearly expressed will of the American people that our forests need more protection. And there are some encouraging signs that the new Congress will be listening more carefully.

The leaders of the new Congress have recently stated their intention to move away from the extreme positions of the 104th Congress and to seek consensus that reflects the will of the American people. **Senator John McCain**, a westerner and a Republican, has written, “Polls indicate that the environment is the voters’ number-one concern about continued Republican leadership of Congress...Only by faithfully fulfilling our stewardship responsibilities can we expect to remain the majority party. ”

Our mission is clear and simple: Our obligation, as stewards of God’s creation, is to protect the structure, function, and biological diversity of our forests, wetlands, grasslands, and wildlife. We must use them in ways and at levels that maintain and restore their health and diversity. The result will be more jobs, better communities, and a legacy for our children.

*This article was excerpted from remarks Secretary Babbitt delivered at the Yale University School of Forestry on December 10.*

# Partnerships in Progress

Honorable Albert Gore, Jr.  
The Vice President of the  
United States  
Washington, D.C. 20501

Dear Mr. Vice President:

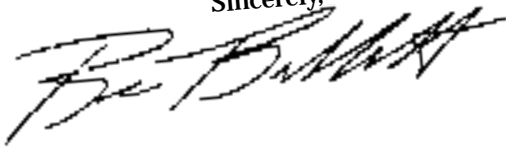
I am pleased to provide you with our annual report on reinvention activities at the Department of the Interior. We have made significant progress over the past year in changing our business practices and finding more cost-effective and efficient management strategies. I am proud of the hard work and creativity our employees have shown in continuing this important reform process. We are looking forward to building on this progress over the next four years, as we create a government for the 21st Century.

As we move toward a balanced budget over the next several years, we know budgets will only tighten. Interior is making progress in improving its programs and operations by using reinvention labs to change and reengineer our key business practices. For example, the Bureau of Indian Affairs has reduced design and construction time for Indian schools by over 50 percent. In the past, it took seven or eight years to plan, design, and build a new school. We will now complete the job, start to finish, in three years or less. These kinds of improvements save time and money, and they help us provide better service to our customers.

A common thread characterizes many of our successful reform efforts: a focus on partnerships and cooperation as a new way of doing business. I see an increasing trend toward more coordinated, cooperative, and cohesive efforts that involve multiple bureaus, and even multiple organizations outside the Department. For example, the Resource Advisory Councils (RACs) created by the Bureau of Land Management provide a new model of collaborative management of public lands and resources. RACs are citizen-based groups with members drawn from diverse interests, including ranchers, environmental groups, tribes, and State and local government officials, that provide advice on land management issues. The councils have been successful in bringing diverse—and often competing—interests together to deal with issues of mutual concern.

Partnerships are one of the best ways we can improve, reinvent, and reengineer our programs and our business practices, improve our customer service, and leverage scarce resources. The enclosed summary shows some of the examples of NPR-inspired change and the partnerships we are creating here at Interior.

Sincerely,



## Real Time River Flow Data

During the 1997 floods in California, the U.S. Geological Survey's real time stream flow monitoring system was in heavy use. It disseminated real time data on river levels and stream flow over the Internet—information that was crucial to the U.S. Army Corps of Engineers, the Bureau of Reclamation, as well as State agencies and private sector companies that had to make critical decisions about the management of dams and reservoirs to help control the floods. The National Weather Service also depends on USGS's stream flow data to forecast the timing and peak size of floods. The information also is available to the public and news media via the USGS Internet web site.

## Restoring the Everglades

In south Florida, Interior has broken barriers between the state of Florida, the sugar industry, farmers, coastal urban water districts, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the National Park Service so that they can all cooperate in a massive joint initiative to restore the Everglades. This effort involves doubling the federal investment in the Everglades to \$1.5 billion over seven years, acquiring 100,000 acres of land to filter water flowing into the Everglades, and replumbing the artificial system of canals, dikes, and pumps built over the last century in order to restore the River of Grass as it flows down to Florida Bay.

## Restructuring Minerals Management

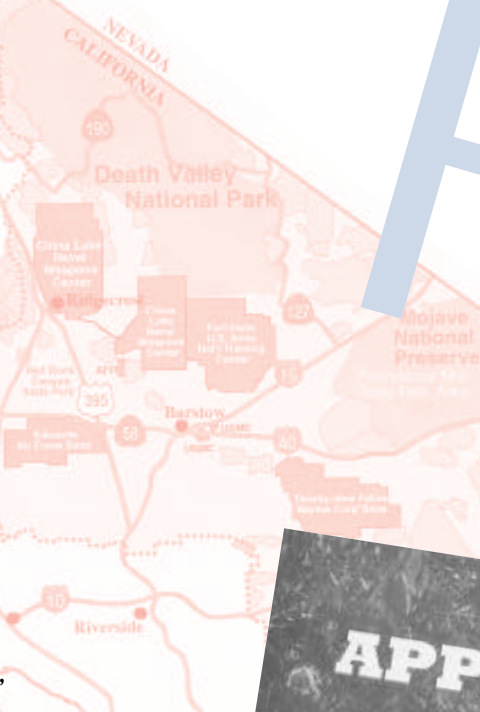
The Federal Oil & Gas Royalty Simplification and Fairness Act of 1996 has significantly changed how the Mineral Management Service's Royalty Management Program is structured. MMS has implemented new regulations, modified computer systems, and reengineered operational processes. Through constituency outreach sessions, MMS has worked closely with States and industry to provide guidance and listen to their ideas and recommendations.

This effort follows a successful partnership with MMS's Offshore Program and the Alaska Stakeholders Task Force. This Task Force includes representatives from the oil and gas industry, environmental, commercial fishing and development communities, Native and subsistence interests, Coastal Districts and Coastal Resource Service Areas, and federal, State, and local governments to provide early input on lease sales and recommendations to be incorporated into the Final 5-Year Oil and Gas Leasing Program (1997-2002).

# Partnerships in Progress

## California Desert Protection

The National Park Service, Bureau of Land Management, Fish and Wildlife Service, and the United States Geological Survey have used the reinvention laboratory approach to overhaul management of the eight million acres of public land affected by the California Desert Protection Act of 1994. We greatly expanded Death Valley and Joshua Tree National Monuments, created the Mojave National Preserve, and designated more than 3.7 million acres of Bureau of Land Management lands as wilderness. These changes meant changing land classifications and agency jurisdictions. Through the reinvention approach, the affected agencies identified what activities they could accomplish more efficiently together. Local managers now coordinate budgets, share personnel and office space, develop cooperative strategies, and provide efficient customer services. These include a single interagency fire-fighting organization, co-located visitor information staff and materials, and pooled law enforcement operations.

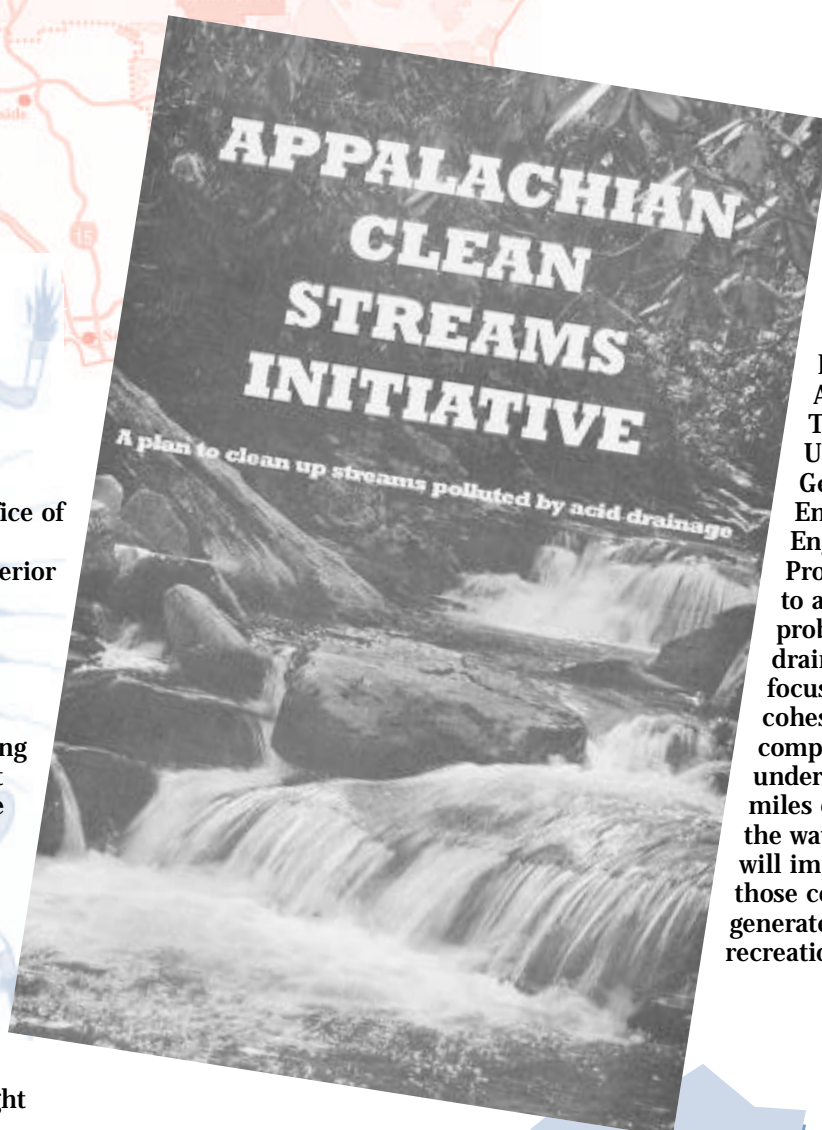


## Resource Advisory Council

The Bureau of Land Management has formed 23 Resource Advisory Council (RACs) in the Western states to provide advice on the management of public lands and resources. RACs are citizen-based groups that advise the Bureau on standards of rangeland health and guidelines for grazing management. Each RAC consists of 12 to 15 members from diverse interests in local communities, including ranchers, environmental groups, tribes, State and local government officials, academics, and other public land users. The councils have been successful in bringing diverse—and often competing—interests to the table to deal with issues of mutual concern. This inclusive approach shows great promise as a means to successfully deal with long-standing problems of public land management.

## BIA Schools On-Line

A partnership between the Bureau of Indian Affairs' Office of Indian Education Programs, major private telecommunications companies, software firms, and Interior offices is reengineering the telecommunications and computer technology infrastructure serving BIA schools and Indian communities. This effort will enhance opportunities for student, teacher, and family learning through access to the resources available through the information superhighway. The network will allow sharing of curriculum and culturally relevant information about American Indian Tribes. The direct beneficiaries will be the students and teachers in the BIA school system, consisting of 187 schools that enroll 50,000 American Indian children in 23 States. Indirectly, all American Indian citizens and anyone else with access to the World Wide Web will benefit from having information about American Indians available electronically. The first step was taken in August 1996 when the Microsoft Corporation contributed more than \$350,000 in software, computers, and cash to Four Directions, a BIA project that will electronically link Indian schools in eight States.



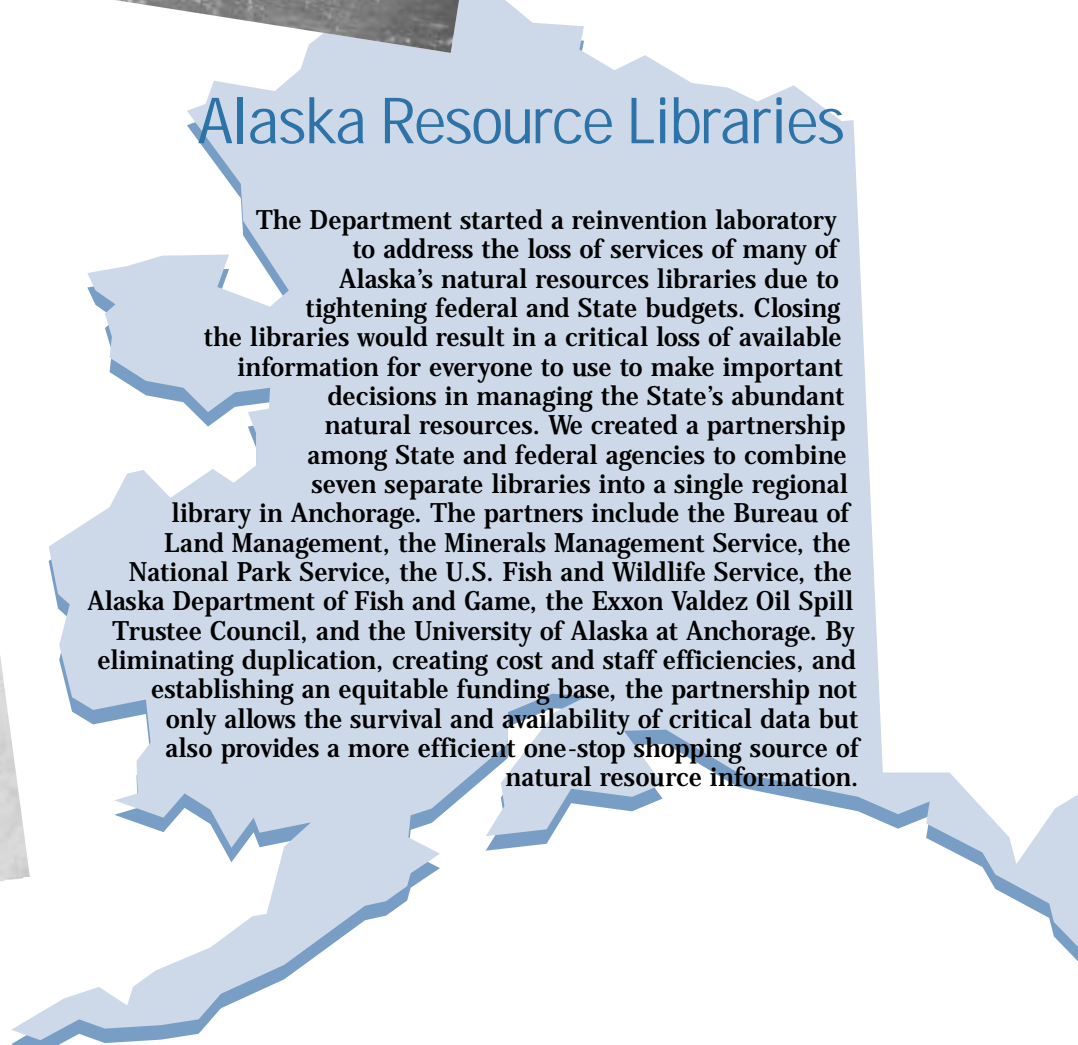
The Office of Surface Mining Reclamation and Enforcement is leading the multi-partner Appalachian Clean Streams Initiative. The agency partners, including the U.S. Fish and Wildlife Service, the U.S. Geological Survey, the Department of Energy, the U.S. Army Corps of Engineers, and the Environmental Protection Agency, are working together to address the most critical water problem in Appalachia—acid mine drainage. OSM is coordinating and focusing previously disparate efforts into a cohesive approach that has led to a comprehensive and accelerated undertaking to clean up more than 7,000 miles of polluted streams. The quality of the water supplies of coal field communities will improve. Economic benefit will come to those communities through the dollars generated by enhanced tourism and recreational opportunities.

## Reclamation's Power Management Laboratory

The second largest hydropower producer in the nation, the Bureau of Reclamation is a major player in the hydropower industry. As the electric utility industry has restructured and moved closer to a market-driven environment, Reclamation recognized a need to change as well. This changing environment, coupled with the need to make government more responsive to its customers, led Reclamation to initiate a Power Management Laboratory which launched the most aggressive and intensive assessment of its power program ever. Through this Lab, Reclamation is reinventing its power program and creating a vision centered on customer service, efficient operation, controlling costs, financial accountability, and management of its natural resources. This initiative can be a model for other government agencies and the electric utility industry. Reclamation's future direction includes a business-like approach to managing its power program, better reflecting the nature of the industry and providing better accountability to its customers and the American taxpayers who have entrusted it with much of the nation's hydropower resources. The Lab results have been reported in the Reclamation publication *Future Generations: A New Era of Power, Performance, and Progress*.

## Alaska Resource Libraries

The Department started a reinvention laboratory to address the loss of services of many of Alaska's natural resources libraries due to tightening federal and State budgets. Closing the libraries would result in a critical loss of available information for everyone to use to make important decisions in managing the State's abundant natural resources. We created a partnership among State and federal agencies to combine seven separate libraries into a single regional library in Anchorage. The partners include the Bureau of Land Management, the Minerals Management Service, the National Park Service, the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, the Exxon Valdez Oil Spill Trustee Council, and the University of Alaska at Anchorage. By eliminating duplication, creating cost and staff efficiencies, and establishing an equitable funding base, the partnership not only allows the survival and availability of critical data but also provides a more efficient one-stop shopping source of natural resource information.





Gordon P. Eaton, Director  
Marti Quigley and Kathleen Gohn,  
Bureau Editors



Above, Mrs. Liu, an interpreter from the Chinese National Bureau of Surveying and Mapping, and Janet Crawford-Tilley, USGS, pause during a visit to the Great Wall of China. At left, USGS' Paul Young waves from a high point of the Wall. Below, Mr. Chen Yong, Jilin Provincial Surveying and Mapping Bureau, and Paul Young enjoy a Saturday boat ride on Pine Flower Tree Lake in Jilin Province.



## USGS-China Exchange Data on Geographic Information Systems

**Paul Young**, a USGS cartographer, doesn't speak Mandarin, but he understood some of his hosts' conversation in Chinese when they were discussing a geographic information system software program.

"Arc/Info coverage does not translate from English to Chinese, so although I don't know their language, I always know when Arc/Info software is being discussed by my colleagues from China," said Young, who participated in a technical exchange last summer with government cartographers in the People's Republic of China.

Geographic information systems, which integrate various types of earth science data and present the information in visual displays for a variety of uses, is a developing technology. It is important to future USGS programs that can benefit from broad applications, such as ecosystems, hazards, and geology, as well as from cooperative exchanges of information.

USGS carries out its project with the Chinese government under an international treaty. In 1985, the USGS and the National Bureau of Surveying and Mapping—the national mapping agency in the People's Republic—signed the Protocol for Scientific and Technical Cooperation in Surveying and Mapping Studies. The agreement promotes scientific and technical cooperation in geodesy, photogrammetry, remote sensing, cartography, geographic information systems, and production management. The Protocol is consistent with the general agreement between the U.S. Government and the People's Republic on Cooperation in Science and Technology.

Since the geography of both the United States and China is large and diverse, both mapping agencies share common problems of collecting and maintaining geospatial data for their respective users. Each agency also shares the concern of coordinating data collection with state, provincial, and local governments.

During yearly technical exchanges, teams from each agency work on projects of mutual interest. Recent projects included producing terrain fly-throughs using Landsat satellite data and digital elevation models, using geographic information system technology to study urban growth, and producing homepages for the world wide web. Each agency also provides lectures on topics of common interest.

During a June 1996 trip to China, **Janet Crawford-Tilley** and Young discussed using GIS techniques to integrate National Wetlands Inventory data, to study 200 years of urban growth in the Baltimore-Washington area, to visualize terrain using fly-throughs, and to merge Landsat and digital orthophoto quadrangle data. Their Chinese colleagues gave them information on 1:250,000-scale data base development, national rivers inventory, and geographic names data base. While most of their time was spent in Beijing, Crawford-Tilley and Young also traveled to the Jilin Provincial Mapping Bureau and lectured to about 150 people there.



Janet Crawford-Tilley discusses a geographic information systems project with cartographers and geographers at the Jilin Provincial Surveying and Mapping Bureau.

### New Studies Focus on Endocrine Disruptors

The USGS recently released results of two studies that document a potential link between endocrine disruption in fish and the occurrence of certain contaminants in water, sediments, and fish tissue.

"Endocrine disruptors have become a popular concern," said **Dr. Dennis Fenn**, USGS chief biologist, "and these findings suggest the potential for a significant problem. We are committed to continuing our biologic and hydrologic role in directing, conducting, and coordinating studies to help managers of America's landscape better understand and manage our common heritage."

USGS scientists presented findings from the multi-agency studies in mid-November at the annual meeting of the Society of Environmental Toxicology and Chemistry in Washington, D.C. The studies are part of a broad-based effort led by the USGS to investigate the effectiveness of new methods for monitoring endocrine disruption in fish in freshwater environments.

The methods, developed by researchers at the University of Florida, were used to gather evidence on how widespread endocrine disruption in fish may be in the United States and to evaluate potential relationships between endocrine disruption and levels of contaminants. The long-term effects of these apparent endocrine disruptions in fish, however, are not known. Detailed follow-up studies are needed to determine if fish populations are affected.

Both studies focused on carp, a common, bottom-dwelling fish species whose feeding habits expose them to contaminants found in the water, sediments, and food. The studies were based on data on contaminants and other water-quality characteristics that were collected in a USGS National Water Quality Assessment Program.

One study, a national reconnaissance of sex steroid hormones in fish, investigated evidence of endocrine disruption at 25 sites that represented a wide range of environmental conditions in selected watersheds across the country. The national study represents the largest data set to date looking at endocrine disruption in fish, particularly carp. The other study looked specifically at contaminants and potential endocrine disruption effects on fish in the Las Vegas Bay of Lake Mead, Nevada, a popular public recreation area managed by the National Park Service.

The national study showed significant differences in sex steroid hormones from many streams within major regions of the country. The study also identified significant differences in vitellogenin, an estrogen-controlled protein necessary for egg development in fish and birds, among the 25 sampling sites. Although some of these differences probably result from natural variability, correlations between contaminants and the levels of hormones and vitellogenin in carp indicate that some of the site-to-site differences were associated with certain environmental contaminant groups.

The second study examined the occurrence of organic chemicals (pesticides and other compounds) in water, bottom sediments, and carp in Las Vegas Wash and two nearby bays (Las Vegas and Callville) in Lake Mead. Pesticide concentrations were found to be higher in Las Vegas Wash and Las Vegas Bay than in Callville Bay, the study's reference site. Similarly, several industrial chemicals were detected in higher concentrations in bottom-sediment samples from Las Vegas Bay than in samples from Callville Bay. Many of the detected compounds have been linked in other studies to the disruption of endocrine systems, which control reproductive functions in the fish.

The most notable evidence of endocrine disruption that was determined by the USGS study is the presence of female egg protein in blood-plasma samples of male carp from Las Vegas Wash and Bay and elevated concentrations in female carp from Las Vegas Bay. USGS officials cautioned that while the findings are an important guidepost, they cannot begin to answer questions about human health, pointing the way to a need for more detailed study.

# National Wetlands Research Center Reaches Out

A rock star, a kinetic art sculptor, and a room full of 11-year-old video producer wanna-bes. The latest line up on a TV talk show? Applicants for an arts grant?

Hardly. They are some of the great American people so often referred to as “the public” in outreach programs. The Biological Resources Division’s National Wetlands Research Center in Lafayette, Louisiana, is learning daily that when it comes to outreach about wetlands, the public is full of diverse and talented individuals, eager in their quest for environmental information and creative in their use of that information.

The Center’s outreach programs and research in the Caddo Lake area recently won the 1996 Ramsar Stewardship Award from the **Caddo Lake Institute**. The award recognized research and outreach efforts by the Center for the Caddo Lake area, which has been designated a

Ramsar Wetlands. (The name Ramsar comes from the city in Iran where The Convention on Wetlands of International Importance was signed in 1971. The Ramsar Convention, which applies especially to wetlands that serve as waterfowl habitats, provides a framework for the international cooperation for the conservation of these habitats.)

An example of the Center’s successful outreach efforts is its work with rock star **Don Henley’s** Caddo Lake Scholars Program. The musician, with the rock group **The Eagles**, donates his time and money to the program that educates local students, teachers, and community leaders about the wetland values associated with the Caddo Lake ecosystem of northeast Texas.

Center staff help to provide wetlands training in local school systems and advise on the creation of wetland sites on school campuses to serve as outdoor labs. The Center has also developed an educational, multimedia production, complete with touch screen, bird-call quizzes, videos of scientists in the field, and map data.

While most requests to the Center for aerial photos are for scientific purposes, sometimes educational and artistic purposes combine to create an unusual product. Sculptor **Scott Gilliam** not only recognized the information value of aerial photographs but their beauty as well. He has begun creating tiny robots of clothing items, trains, airplanes,



Staff of the National Wetlands Research Center answer questions from the news media about the Caddo Lake Institute’s 1996 Ramsar Stewardship Award. From left are Jimmy Johnston, Carroll Cordes, Virginia Burkett, and Bob Stewart. The award is at right. Photos by Natalie Gormanous, National Wetlands Research Center

and automobiles that skate over vinyl blowups of aerial photographs. These sculptures are fixed to the middle of luggage carousels in the international concourse of the Atlanta airport and help to increase travelers awareness of the surface of the earth they travel over.

And the video producer wanna-bes? Well, they’re actually sixth grade students from Lafayette’s **Paul Breaux Middle School** who visited the Center to videotape part of a documentary on the area’s natural history. They intently listened to presentations by Center scientists, asked questions, and then became a production team, writing scripts and cue cards, memorizing lines, and shooting scenes. After editing the tape, the students will exchange their video with one from students in Arizona so that both groups can appreciate each other’s unique local natural resources.

Although the Center rarely works with young children, an exception was made for 300 kindergarten and first graders from **L. Leo Judice School** in Scott, Louisiana, who recently visited the Center to learn more about wetlands, their school’s library theme for the year. A busload a day of different students arrived over a period of two weeks to learn about plants and animals, food chains, and scientific research. They observed frogs, turtles, dragonflies, water striders, tadpoles, mockingbirds, and wax myrtles in the Center’s created wetland; observed ducks with radio transmitters; and learned how scientists use photography and mapping in their work.



Sixth-grade students in Lafayette make a wetland video at the National Wetlands Research Center to swap for one made by a school in Arizona, thereby sharing local information on diverse habitats. Photos by Natalie Gormanous, National Wetlands Research Center



## Earthquake Map Helps California Prepare

More than 70 percent of California’s population lives in an area where high ground shaking could occur in the next fifty years, according to a study released in mid-December by state and federal scientists.

The study, *Probabilistic Seismic Hazard Assessment for the State of California*, is the first joint hazard assessment by the California Department of Conservation’s Division of Mines and Geology and the U.S. Geological Survey. It represents, according to the authors, an unprecedented effort to obtain consensus within the scientific community regarding earthquake hazard.

“This hazard assessment is part of the State of California’s continuing effort to apply the emerging understanding of our state’s geologic hazards to reduce the loss of life and property,” said **James F. Davis**, California state geologist. “Working with our partners at the federal level, we’re continuing to reduce risk for future generations of Californians.”

**Robert Page**, coordinator of the USGS earthquake program, said the study gives the scientists’ best estimate of the probable maximum levels of horizontal ground shaking that could be expected throughout the state in the next fifty years.

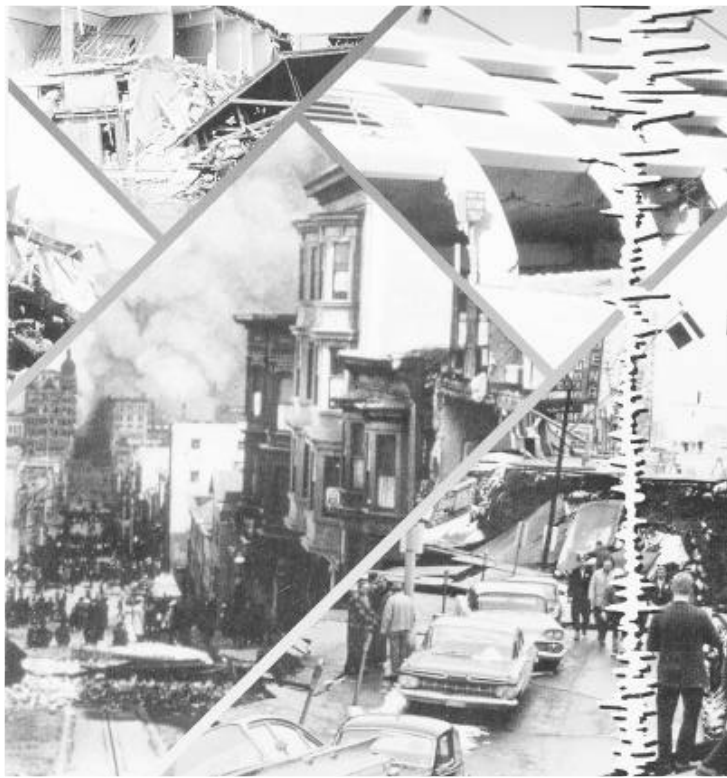
“Engineers, geologists, and public policy makers can use this information in setting earthquake retrofitting priorities, building code changes, emergency response planning, assessing earthquake insurance rates, and inland use planning,” said Page. “This information is the first step in revising the Building Seismic Safety Council provisions that

recommend seismic standards for new construction.”

Data for the study were compiled and analyzed by the California Department of Conservation’s Division of Mines and Geology under the 1990 Seismic Hazard Mapping Act. The state will also use the California data as input into the ground failure and landslide zone maps currently under production.

The California data were supplied to the USGS for its use in preparing the National Earthquake Hazard Reduction Program maps for the entire country. These maps estimate the probable maximum levels of horizontal ground shaking that could be expected throughout the nation in the next 50 years.

The USGS maps use consistent methodologies to analyze the data for the whole nation and show the regional variations of earthquake hazard. The maps are a result of a three-year effort that incorporated new methodologies for hazard analyses. The results include data from historical earthquakes and geologic data from more than 500 faults nationwide.



Clockwise from top left, Coalinga, California, 1983; Northridge, California, 1994; Anchorage, Alaska, 1964 ; San Francisco, California, 1906. USGS photos